

Mine Water Treatment

Temporary mine water treatment facilities have been installed and tested to determine the feasibility of treating excess water which may accumulate in the Bingham Canyon reservoir during the 1983 spring runoff.

Purpose

Record precipitation during 1982 and 1983 has resulted in excess water in the Bingham Canyon reservoir. During the 1983 spring runoff, the reservoir could overflow. Any overflow from the reservoir would be contained on Kennecott property, but since surface runoff is mixed with decopperized mine leach solution, treatment would substantially reduce the impact on groundwater quality.

Treatment

Lime neutralization using slaked CaO to pH 6-9 followed by flocculation and settling.

Operating Parameters

Slaking Rate - 160 tons CaO maximum per day batch process.

Treatment Rate - 4,000 gal/min maximum. Under normal operating conditions, two to four million gallons per day can be treated.

Method - Surface water which would enter the Bingham Canyon reservoir is diverted to a small reservoir where it can be discharged for treatment or overflow back into the Bingham Canyon reservoir.

Test ResultsTotal Concentrations

	<u>Untreated (mg/l)</u>	<u>Treated (mg/l)</u>	<u>% Reduction</u>
pH	3.7	6.5	--
TSS	98	17	--
TDS	31,052	6,576	79
Cu	121	0.11	99
Zn	84	0.94	99
Fe	418	13.6	97
Cd	0.23	0.01	96
Ag	0.04	0.02	50
As	2.1	0.01	99
Se	0.02	0.01	50
Pb	0.68	0.26	62

Potential

Early in 1982, based on precipitation during 1981, Kennecott recognized the potential for the accumulation of storm water to exceed the capacity of the Bingham Canyon reservoir. At that time, addition of make-up water to the leach system was terminated by diverting mine pit water and the north ore shoot water to the evaporation ponds. Because of record precipitation in 1982 and 1983, there is a definite potential for accumulated surface water to overflow the reservoir between May 15 and June 15, 1983. It is impossible to predict the magnitude of the potential or the amount of overflow which could occur because the accumulation is directly dependent on future daytime temperatures and precipitation.

An evaluation of all available data and comparing the present year to the storm water accumulation which occurred in 1975 shows that overflow could occur.

Present Intent (April 28, 1983)

In order to minimize the potential for overflow from the Bingham Canyon reservoir, Kennecott intends to treat excess mine water at a rate of about one million gallons per day for the next ten days and then reevaluate the potential for overflow. The treated water will be diverted to evaporation ponds where it is totally contained on Kennecott property. During the treatment tests generated sludge has been contained in a small settling pond, but during actual treatment the sludge will be allowed to settle in the Bingham drainage and in the evaporation ponds. The beneficial effect of spreading out the treated effluent sludge on old acidic mine tailing in the Bingham drainage is being considered.

Update (May 6, 1983)

In anticipation of the additional surface water accumulation caused by precipitation between April 28 and May 6, the rate of treatment is being increased to about four million gallons per day by operating the treatment facilities on a 24-hour-per-day basis. This rate of treatment will continue for several days, and the situation will be reevaluated.

38" below the spillway

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Liquid 7570
Solid 2570

EP toxicity test of sludge generated from the treatment of excess mine water using lime neutralization and flocculation.

(Milligrams per Liter)

	<u>EP Concentration</u>	<u>Standard</u>	<u>Total Sludge Concentration</u>
Arsenic	0.09	5.0	0.23
Barium	< 0.1	100.0	0.9
Cadmium	0.10	1.0	0.15
Chromium	0.14	5.0	0.17
Lead	0.34	5.0	0.84
Mercury	0.001	0.2	0.001
Selenium	< 0.004	1.0	< 0.004
Silver	0.02	5.0	0.07

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